

# Sara Comai

## Curriculum Vitae

### Current position and education

Sara Comai is associate professor at the Department of Electronics, Information and Bioengineering of Politecnico di Milano since March 2007. She is part of the departmental research group "Data, Web and Society" and of the multidisciplinary group "Assistive Technology Group".

She graduated in Management Engineering at Politecnico di Milano in 1996 and received a PhD in Computer Engineering and Automation at the same university on 13 January 2000. From 2000 to 2002 she was a research fellow and from 2002 to 2007 a researcher at Politecnico di Milano.

### Research activities

Recent research activity of Sara Comai focused on assistive technologies, data-intensive applications, visualization and advanced interfaces:

- Since 2012 she works in the Assistive Technology Group (ATG), a multidisciplinary working group whose mission is to "identify, predict, implement, promote and apply innovative methods and technologies for the development of sustainable solutions for people with frailty (disabled, elderly, etc.) to guarantee the recovery of functionality, social integration, equal opportunities, health, self-determination and quality of life ". Sara is one of the group coordinators and contributes to multidisciplinary research with her knowledge on data management and user interfaces. Her main recent activities are related to: a) development of applications to provide services to support indoor mobility of older people and wheelchair users in hospitals or nursing homes, and enable them to follow safe routes to reach destinations considering their needs and / or limitations (ALMA project – (2013-2016)); b) Development of a technological platform that extends the concept of smart home and offers flexible and customizable services to support people with fragility, to allow them to live at home as autonomous as possible (ADALGISA project (2013-2015)); c) Development of tools and solution to enrich geographical maps with information about accessibility for wheelchair users and for people with limited mobility (MEP project (2014-2016)).
- Methods and tools for the *specification, design* and automatic *generation* of complex data-intensive applications (on extended Web with Web services, workflows and exceptions) and mobile applications. In particular, he contributed to the WebML language, a visual notation for the conceptual specification of large Web applications, focusing on the analysis of the composition and navigation models of this language in order to determine useful properties for the construction of correct hypertexts. Her recent works concern the study of the semantics of IFML (Interaction Flow Modeling Language), an OMG standard that supports the platform-independent description of graphical user interfaces for devices such as desktop computers, laptops, mobile phones, and tablets.
- Study of the problems of *presenting* complex data-intensive applications. Examples of problems include: 1) the definition of different levels of detail (LoD - Level Of Detail) for complex data-intensive Web applications in which the user can choose the amount of information to be displayed according to his needs. 2) Semi-automatic support to the arrangement of information contained in the pages of a site (automatic display layout of Web pages) or to position results of a search engine, through techniques based on constraint programming or through systems of rules and heuristics. 3) Modeling of "rich" Web interfaces based on Rich Internet Applications (or RIA), a variant of Web-based systems able to define both desktop applications and Web applications.
- Methods and tools for the development of *advanced interfaces* based on haptic systems, that is, on systems that give back to the user forces (e.g., vibrations, attraction / repulsion forces, etc.) or with gestural interaction. Multimodal interfaces combining different interactive input / output modes have also been defined and evaluated with end users.

She participated in the following research projects:

- 2002-2004 CNR - ECD project "Technologies to enrich and provide access to content".
- 2007-2009 - "Autonomamente" (funded by Fondazione Cariplo), in collaboration with the So.LA.RE network, aims at creating apartments with innovative technological solutions to support the independent life of people

with cognitive disabilities: within this project an AAC interface for money, time and communication management has been tested.

- 2008-2013 Research project ERC "Search Computing" (SeCo), in which Sara Comai dealt with aspects of presentation of the interface.
- 2013-2016 AAL (Ambient Assisted Living, call 4) research project "Ageing without Losing Mobility and Autonomy (ALMA)". The project proposes a hardware / software system to facilitate the movement of people with motor disabilities; within this project, Sara Comai dealt with the multimodal interface on mobile devices to support indoor navigation.
- 2013-2015 - Cluster SHELL (funded under the MIUR call "Tecnologie per gli ambienti di vita") on the development of technologies for shared and interoperable domestic ecosystems for sustainable, comfortable and safe living environments.
- 2013-2015 - ADALGISA (funded by the program "Smart City" of Lombardy Region) aims at building a technological platform capable to offer flexible, personalizable, and integrated tools with social and relational functionalities in support of a most autonomous life possible for the fragile people.
- 2014-2016 - Polisocial Award for the "MEP MEP for Easy Paths" project, funded by the Milan Polytechnic, on the development of tools for the enrichment of geographic maps with information on accessibility for motor disabilities.
- 2017 – CrowdInsights (funded by EIT digital) aims at providing a tool to monitor urban environments through IoT sensors, mobile phones and social media to understand urban dynamics.

Sara Comai has been a reviewer for the following international journals (as well as for numerous national and international conferences and workshops).

- Transaction on Information Technology (TOIT)
- Transaction on Knowledge and Data Engineering (TKDE)
- Transaction on Database Systems (TODS)
- Transaction on Software Engineering (TSE)
- Transaction on Learning Technologies (TLT)
- Journal on Very Large Data Bases (VLDBJ)
- Communication of the ACM (CACM)
- Journal on Knowledge and Data Engineering (KDE)
- Journal of Web Engineering (JWE)
- International Journal of Web Engineering and Technology (IJWET)
- Software and Systems Modeling (SOSYM)
- Computers and Education (CaE)

She has been a member of the program committees of several conferences in the area of databases, Web and mobile / multimedia, including: EDBT 2004 demo, SIGMOD 2005, SAC 2006, EDBT 2008-2009, ICDE 2009, Web Intelligence since 2009, WebIST since 2012, Mobile computing and Multimedia (MoMM) since 2008, Goodtechs since 2016.

She organized several conference tracks and workshops in the context of international conferences in the database and Web area (SAC, ICWE, CAISE, OTM, ECOWS); she has been the editor of special issues for journals in the Web area (JWE).

## Teaching activities

Sara Comai has held the following courses related to the project:

- Since 2004 "Database systems 2" / "Advanced data bases" for the Master Degree course in Computer Engineering, at the Como campus of Politecnico di Milano.
- Since 2009 "Algoritmi e principi dell'informatica" for the Bachelor Degree in Computer Engineering, at the Como campus of Politecnico di Milano.
- From 2003 to 2008 "Informatica 3 (Algorithms and data structures)" for the Bachelor Degree in Computer Engineering, at the Como campus of Politecnico di Milano for the Online Degree in Computer Engineering.

She was also a lecturer of the following courses, partially related to the project:

- Since 2013 "Computer graphics" for the Master's Degree in Computer Engineering, at the Como campus of Politecnico di Milano.
- From 2005 to 2011 "Advanced image synthesis" for the Master's Degree in Computer Engineering at Politecnico di Milano.
- From 1999 to 2002 "Computer graphics (multimedia applications)" for the Diploma in Computer Engineering at the Faculty of Engineering of Politecnico di Milano.